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Internationalization Orientation in SMEs: The Mediating Role of Technological Innovation

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This study examines the relationship between internationalization orientation and international performance of small and medium-sized enterprises (SMEs), and the mediating effect of technological innovation. Prior research suggests that internationalization is a prominent strategic choice for SMEs growth and profitability. However, there is still no explicit agreement on how internationalization affects international performance. Similarly, the role of innovation on performance has long been emphasized, but the implications of technological innovation on international performance are still eluding us. Our investigation of 116 SMEs in the United Kingdom reveals that internationalization orientation has a significant effect on their international performance. SMEs that have a strong international orientation can achieve better international firm performance. We further demonstrate that there is an inverted U-shaped relationship between technological innovation and international firm performance among SMEs. In addition, the results indicate that technological innovation positively mediates the effect of internationalization orientation on international firm performance, particularly for the SMEs exhibiting moderate levels of technological innovation activities. The findings of this study suggest that managers can improve international performance by combining inward and outward internationalization orientation with technological innovation activities in their strategic decisions.

Keywords: SME internationalization, international orientation, technological innovation

1. Introduction

With the growing importance of small and medium-sized enterprises (SMEs) entering the international marketplace, the SME literature has witnessed an increasing amount of research particularly around the antecedents of internationalization and performance implications (Hernandez and Nieto, 2016; Saeed and Ziaulhaq, 2018; Zhou et al., 2007). Many studies have tried to decipher the relationship between internationalization and firm performance in the past three decades. Yet, empirical results remain contradictory and inconsistent, with outcomes varying from positive to negative, to a U-shaped relationship or no relationship whatsoever (Bianchi et al., 2017; Hsu et al., 2013; Knight and Cavusgil, 2004; Mohr and Batsakis, 2017; Sullivan, 1993; Zhou et al., 2007).

Furthermore, previous studies have mostly focused on the internationalization-firm performance relationship of MNEs (Almor and Hashai, 2004), while sparse attention has been given to the performance implications of internationalization strategy in the SME context (Hernandez and Nieto, 2016; Jansson and Sandberg, 2008; Lu and Beamish, 2001). However, internationalization patterns and strategies of larger

firms do not always have the same implications for SMEs, hindering as such any direct comparison. From one hand side, SMEs differ not only in size from their larger counterparts, but also in risk perception, motives, financial and non-financial resources, capabilities and speed of decision-making (Svetličič et al., 2007). To give an example, while internationalization patterns of large firms tend to be determined by the existence of slack resources and/or the efficiencies that can be achieved in the foreign market (Dunning, 1980, 1988), in smaller firms, due to resources restrictions, internationalization is highly influenced by the motives and decision makers' level of skills and knowledge (Oviatt and McDougall, 1994; Reuber and Fischer, 1997).

On the other hand, and while MNEs and micro-MNEs focus on value-added activities and standardized products and services, SMEs usually target niche markets and focus on specialization and adaptation strategies. MNEs may benefit from long developed marketing and production capabilities, but they usually lack the agility to adopt to environmental and swift market changes; they hence tend to be highly cost-sensitive when targeting foreign markets. On the contrary, SMEs, lacking a strong reputation prior to their entry in a foreign market, tend to rely heavily on their technological know-how and agility in adapting to the requirements of *niche* markets that can allow them to develop unique competitive advantages within (Svetličič et al., 2007).

Changes in the global economy and being constantly faced with a dynamic fast-paced competitive global landscape, SMEs' internationalization activities have become one of the most crucial strategic decisions for managers (Adomako et al., 2017) and their ability to adapt rapidly within the global market has become critical to their growth and long-term survival (Dominguez and Mayrhofer, 2017; Gupta et al., 2014; Gupta and Barua, 2016; Lee and Park, 2006). After all, to a certain degree, internationalization and growth are intertwined (Buckley and Ghauri, 1993). For those SMEs operating in technology-based sectors, it is nowadays agreed that it is no longer possible to be successful without a good appreciation of the global competition and/or a presence in international markets (Jones, 2001; Oakey and Mukhtar, 1999; O'Cass and Weerawardena, 2009). Yet, while many firms view internationalization as an integral part of their growth, unfortunately not all are successful in their internationalization activities (Lee and Park, 2006). Therefore, decoupling the international strategy of SMEs and how managers can develop and/or utilize recourses and capabilities effectively to survive in foreign markets, remains one of the long-standing, but still a concurrent question in the relevant literature (Gupta et al., 2014).

Undoubtedly, internationalization provides many advantages for SMEs including increasing sales, markets, new resource acquisition, economies of scale, reducing local market risks (Musteen et al.,2014), enhancing productivity and profitability, and improved firm performance (Dowling and Helm, 2006; Hsu et al., 2013). Nevertheless, internationalization does not come easy, as it is accompanied by several barriers and threats that could negate the successful activities in foreign markets of all firms.[1] Unfortunately for SMEs overcoming these barriers can be even more problematic. As it is well known, the small size of SMEs is accountable for their limited tangible assets (i.e. equipment, property), insufficient managerial skills, lack of administrative systems, limited financial and human resources (Onkelinx et al., 2016) , and as such limited product offerings (i.e. limited range of products and services at every point in time) (Hollenstein, 2005; Knight and Kim, 2009; Reuber and Fischer, 2011; Terziovski, 2010), that can severely hamper their competitiveness within the foreign markets.

Motivated by the international entrepreneurship theory (McDougall and Oviatt, 2000), we propose that being proactive in strategic initiatives is imperative for achieving a competitive advantage and better firm

[1] Increasing level of competition, high transaction costs and the degree of uncertainty in terms of cultural, legal or political differences are only some of the barriers that firms are called to overcome in their internationalization process (Coviello and McAuley, 1999; Lee et al., 2012; Musteen et al., 2014).

performance (Knight and Kim, 2009). We predict a positive and direct relationship between internationalization orientation (IO) and international firm performance. Yet, and acknowledging that several inward factors might mediate the above-mentioned relationship (Zhang et al., 2016), we turn our attention to one that has received increasing of attention during the last decades, namely firm's innovation activities (Battisti and Stoneman, 2010).

Since the late 1970s, it has been clear that innovation is not only linked to the international process of firms but that it plays a vital role in their sustainability, future health and international prosperity (Johanson and Vahlne, 1977) and in overall gaining competitive advantage in foreign markets (Cassiman and Golovko, 2011; KylÃheiko et al., 2011). It is further acknowledged that SMEs in international markets tend to adopt novel business models to secure value-creating capabilities (Child et al., 2017), which vary according to the requirements of the international market (Landau et al., 2016). To this end, several authors have attempted to offer support to the above and some few studies have indeed discovered a positive relationship between innovation and SMEs' performance in terms of growth and profitability (Golovko and Valentini, 2011; Robson and Bennett 2000). For example, Golovko and Valentini (2011) provided empirical evidence denoting that when innovation and international activities are combined, sales growth is enhanced (Damanpour, 2010; Damanpour et al., 2009).

Nevertheless, and while it is acknowledged that the development of new product and processes is fundamental to international survival, growth and profitability (de Jong, 2013; Wolff and Pett, 2006), empirical evidence for a direct relationship between innovation and international performance is still unclear. Most studies have examined the effects of innovation and international activities on firm performance independently, and have not considered these two factors as complementary operations. Furthermore, these studies have mainly focused on the innovation activities of exporting SMEs and have not analyzed the relationship between the IO of SMEs, innovation behaviour and firm performance (Cho and Pucik, 2005; Cohen and Klepper, 1996; Golovko and Valentini, 2011). While many studies have examined the effects of internationalization and innovation on SMEs' performance independently, we propose that internationalization and innovation are complementary strategies that enhance SMEs' performance.

We, therefore, contribute to the literature in two distinct ways. First, we advance our knowledge on SMEs' internationalization strategies by specifically investigating the inward and outward operations of IO and their impact on the international performance of SMEs. Despite acknowledging the distinct role of inward and outward aspects of IO early on in the literature, limited attention has been placed on how these aspects impact on the IO - International Performance relationship (Jong and Houten, 2014; Lin, 2014). This is of particular importance to SMEs when developing their internationalization strategy (Hernandez and Nieto, 2016; Welch and Luostarinen, 1993). Simultaneous inwards – outward operations may boost internationalization and technical knowledge, in turn, this will have a direct impact on firm performance and growth (Hernandez and Nieto, 2016).

Second, we examine the mediating role of firms' technological innovation in the IO – international performance relationship. While many studies have examined the role of "individual innovative practices in isolation", they have not considered the mediating role of firm innovation (Battisti and Stoneman, 2010). In this study, we propose that firms' technological innovation has an important direct and indirect, mediating role on the IO - international performance relationship, explaining as such why prior empirical research on the innovation– international performance relationship has been so inconsistent.

Our study focuses on the UK context, a context that has received less attention in the relevant literature (Crick and Spence, 2005). While there are 5.4 million SMEs in the UK[2], accounting for over 99% of all

[2] Data from 2016 National Statistics

businesses that operate in the country, there has been very limited relevant research in this context. By examining 116 SMEs from eight sectors that showcase high innovative activity within the UK (Battisti and Stoneman, 2010; Hooker and Achur, 2014), we offer new insights on the role of IO in their international performance.

The rest of the study is structured as follows. We continue our discussion next with a discourse of the key theoretical underpinnings that have formed the basis for our hypotheses. The methodological considerations are presented next along with the analysis of the data utilized to test our hypotheses. We follow with a description of the study findings and their interpretation, which is concluded with a discussion of our contribution to theory and practice.

2. Literature Review and Hypothesis Development

2.1. Internationalization Orientation (IO)

Internationalization is "the process of increasing involvement in international operations" (Welch and Luostarinen, 1988, p.36). Firms increase their international activities gradually and incrementally as they accumulate learning and experience from their international forays (Johanson and Vahlne, 1977; Mathews, 2006). This process allows firms to reduce the level of uncertainty and unfamiliarity within the foreign market, and increase their commitment respectively (Akbar et al, 2018). International orientation (IO) is the degree to which international firms actively explore new business opportunities in foreign markets and commit appropriate resources for international operations (Moen et al., 2016).

While the role and contributions of SMEs in international markets have increased, our understanding of their adopted processes and patterns remains fragmented (Bianchi et al, 2017; Holmlund et al., 2007; Hsu et al., 2013; Miesenbock, 1988). Some SMEs tend to stay and operate more in their home countries and engage in internationalization as a second priority option. These firms usually prefer to have a low IO and choose low commitment internationalization entry modes. Other SMEs have a higher IO to improve the specific processes, operations or decision-making activities for chasing the new opportunities abroad and achieving a better firm performance (Mort and Weerawardena, 2006).

Zou and Stan (1998) found that IO has a significant and positive effect on SMEs' export performance and highly international-oriented firms are able to better recognize and benefits from new business opportunities and identify threats abroad which is consistent with the study of Moen et al. (2016). They concluded that despite the fact that international activities of SMEs are resource demanding, the level of export sales and firms' growth are higher in SMEs with highly motivated managers who are also highly international-oriented as opposed to low- oriented firms. Thus, the decision to expand internationally is an important decision for SMEs, and possessing an IO mind-set is perceived as a factor which is as important as being aware of international opportunities that can appear from planned or unplanned situations (Knight and Cavusgil, 2004). Unfortunately, the performance implications of this strategy is underexplored (Lu and Beamish, 2006), and sparse attention has been given to investigating performance implications of internationalization strategy in this context (Hernandez and Nieto, 2016).

IO broadly involves recognizing foreign market opportunities and utilizing strategies and methods to reduce the risks of competition, improve business growth, and successfully expand internationally (Knight and Kim, 2009). Knight and Cavusgil (2004) empirically examined the significance of IO in the context of SMEs. Their findings indicated that IO is likely to increase the specific decision-making activities and practices, which are important in recognizing unique foreign market opportunities, and can lead firms to a higher international performance (Hernandez and Nieto, 2016; Lu and Beamish, 2006). Having a high IO

increases SMEs ability to hold and further develop those capabilities and competencies that are essential to their international success (Mort and Weerawardena, 2006).

IO has been examined in two different facets, namely the inward IO and the outward IO, each influencing one another (Welch and Luostarinen, 1993). Inward IO refers to how firms develop their foreign sourcing activities which include techniques and strategies that managers use in order to prepare their firms for entering foreign markets. These include developing and/or acquiring the necessary resources and capabilities such as specialized management skills or advanced technology (Knight and Kim, 2009). Outward IO is related to the penetrating of foreign markets through a variety of means such as developing alliances with foreign partners, choosing the most appropriate modes of entry as well as finding new markets for international expansion (Welch and Luostarinen, 1993). Outward orientation can help firms with limited resources and capabilities to more efficiently target foreign markets, recognize consumers' needs and expectations, gain invaluable opportunities to economies of scale (Zhou et al., 2007), and obtain ownership location advantages in geographic borders (Mort and Weerawardena, 2006).

2.2. Internationalization Orientation and International Performance in SMEs.

Understanding the relationship between internationalization and international firm performance remains an important issue among researchers and practitioners (Lin et al., 2011). Almor and Hashai (2004) argue that the international performance of SMEs remains "paradoxical" due to the difficulty to explain how SMEs are able to compete successfully in foreign market against MNEs, despite their limited resources. There is also a gap in the literature on how internationalization operations featuring inward and outward orientation affect firm performance (Hernandez and Nieto, 2016). To give an indicative example, Lee and Rugman (2012) examined inward aspects of IO (inward FDI) and performance advantages within MNEs. While they discovered that inward FDI acts as a moderator on the relationship between firm-specific advantages and MNE performance, they revealed no clear direct associations.

Deciphering the IO – international performance relationship becomes even more problematic when SMEs are examined. Most prior studies have concentrated on the internationalization - firm performance relationship of large MNEs, paying as a result of little attention to the context of SMEs (Jong and Houten, 2014; Lin, 2014; Lee and Rugman, 2012; Xiao et al., 2013). While these results offer invaluable insights, inevitably they cannot be applied to SMEs, because – as already mentioned – they are so different in terms of their size, risk perception, motives, financial and non-financial resources, and also strategies (Lu and Beamish, 2001; Svetličič et al., 2007). To this end, SMEs' internationalization patterns and strategies will also significantly differ from those adopted by the MNEs. Meanwhile, the existence of numerous dimensions influencing the underlying relationship hampers the consistency and generalization of the results (Knight and Kim, 2009).

The few studies that have provided evidence for the smaller firms have indicated a positive relationship between IO and international performance. For example, Knight and Cavusgil (2004), examined the relationship between IO and firm performance of 900 born-global firms in the United States, found that a strong IO leads to better firm performance. Similarly, Knight and Kim (2009) identified four key indicators *international orientation*, *international marketing skills*, *international innovativeness*, and *international market orientation* to be the most influential in the international performance of SMEs. Furthermore, drawing on data from 233 Chilean SMEs, Bianchi et al. (2017) found that international opportunity recognition and international networks mediate the relationship between international orientation and internet technology capabilities on SME international performance. In general, several authors have emphasised the importance of technological resources and capabilities in enhancing SME international

performance (Bianchi et al., 2017; Glavas and Mathews, 2014; Reuber and Fischer, 2011); however, supportive empirical evidence remain scarce (Bianchi et al., 2017).

Most internationalization theories exist to explain the internationalization process of large firms, the question is how well the existing theories could explain the international behavior of SMEs and what factors determine firms' IO. The Uppsala sequential internationalization model (Johanson and Vahlne, 1977) argues that the mechanism of internationalization is an incremental step-by-step process, which progress by learning and knowledge attainment. Thus, firms start by applying low commitment methods of internationalization, targeting neighboring countries first. After gaining experimental knowledge, they can engage in higher commitment modes of internationalization to expand their scope even further (Johanson and Vahlne, 1977). Interestingly, the sequential internationalization theory does not seem to always explain the mechanism of SME internationalization. Many SMEs have been known to expand into foreign markets fast, often skipping the gradual stages of the internationalization process (Oviatt and McDougall 1994). These firms usually acquire knowledge from other resources by employing strategies based on networking with local associations and partners. For the resource restrictive SMEs, utilizing best their managerial skills in developing good relationships with foreign partners, help them gain quick cultural, technical and commercial competencies during their international forays (Johanson and Vahlne, 2009).

Motivated by the above, to explain the mechanism of SME internationalization we turn towards the organizational learning theory (Levitt and March, 1988). According to this perspective, acquiring information and experiential knowledge is of utmost importance for firms operating in global environments (Levitt and March, 1988). Experiential knowledge of internationalization can be obtained by actively operating in foreign markets; it is divided into internationalization knowledge (e.g. knowledge of recognizing foreign market opportunities and the most appropriate entry strategy), market knowledge (e.g. knowledge of acquiring information about customers and rivals) and technology knowledge (Nordman and Melén, 2008) (e.g. knowledge of producing goods and services) (Hernandez and Nieto, 2016). While knowledge acquisition is paramount to international success, to achieve a competitive advantage within a foreign market, a firm should be able to successfully utilize its acquired knowledge in adapting to the new mandates (Vermeulen and Barkema, 2002). In other words, a firm's ability to change and its absorptive capacity become paramount to their international success.

Acknowledging SMEs' advantages of flexibility and change, we therefore argue that SMEs success in international markets will be dependent on their international orientation (IO). Being proactive in the international arena, can help the resources restrictive SMEs to identify opportunities for resource appropriation in the foreign markets, while increasing their market potential and dominance by taking advantage of the inefficiencies within (Johanson and Vahlne, 2009). Meanwhile, recognizing that acquiring different types of knowledge can significantly enhance a firm's absorptive capacity and learning (Casillas et al., 2009; Hernandez and Nieto, 2016), we further expect that a combination of both inward and outward aspects of IO will affect the underlying IO - firm performance relationship (Zahra et al., 2000). Outward IO facilitates the utilization of internationalization and market knowledge, while inward IO provides access to technology knowledge (Hernandez and Nieto, 2016). As such, outward IO – e.g. looking for foreign market opportunities to explore new technologies and/or recognizing new customers – can help SMEs achieve economies of scales and scope by increasing the level of sales and production (Kogut, 1985), or by cooperating with foreign partners (Zhou et al., 2007). At the same time, inward IO can increase international firm performance by utilizing managerial skills, learning/exploiting technologies from foreign market and obtaining capital investment (Buckley et al., 2002).

Unfortunately, there is a gap in the empirical literature on how inward-outward IO affect firm performance. Prior studies have failed to offer a clarity for the simultaneous impact of inward and outward aspects of IO on performance since most have examined the two dimensions separately (Hernandez and Nieto, 2016;

Liang et al., 2012; Welch and Luostarinen, 1993)[3]. Nevertheless, evidence has long denoted that the inward and outward side of internationalization are not separate operations, but are closely intertwined (Welch and Luostarinen, 1993). For example, Karlsen et al. (2003) have argued that inward-outward operations are complementary, as utilizing technology, machinery and know-how knowledge from foreign markets, are necessary to begin production and outward operations. They claimed that this association between inward-outward operations can clarify movements within different stages in firms' internationalization process (Korhonen et al., 1996). Similarly, Karlsen et al. (2003) found that inward activities actually drive and motivate firms to develop their outward activities and vice versa. Indeed, Korhonen et al. (1996) in a large-scale study of Finish SMEs revealed that firms began their internationalization operations inwardly first before proceeding to outward operations.

To this end, more and more recent studies have suggested that both orientations should be viewed in combination, as complementary activities, to fully appreciate their impact on performance (Hernandez and Nieto, 2016). Sadly, only a handful of studies have examined these two dimensions simultaneously. A noteworthy example is the study by Hernandez and Nieto (2016). Based on a sample of European SMEs from different industry sectors, Hernandez and Nieto (2016) analyzed growth variations in firms that adopted different international strategies, and found that firms adopting inward and outward operations simultaneously exhibited higher turnover, as opposed to focusing on one operation alone. They suggested that if firms are able to achieve such a simultaneous focus, then superior benefits could be generated from improvements in their absorptive capacity and connectivity, offering direct effects on their ability to recognize opportunities and trends and improve efficiency (Zahra and George, 2002).

Therefore, we propose that:

H1: Undertaking inward and outward operations simultaneously will have a positive effect on international firm performance

We further hypothesize that there will be no significant relationship between each aspect of operations and international firm performance, as has also been suggested by Zhou et al. (2007).

H2: International Firm performance is unaffected by the presence of inward internationalization orientation.

H3: International Firm performance is unaffected by the presence of outward internationalization orientation.

2.3. Technological Innovation and the International SMEs

Despite the rich empirical discourse on the relationship between internationalization and firm performance, it is still unclear why and how internationalization affects firm performance, and most importantly which are the key factors mediating the relationship (Zhou et al., 2007; Singla and George, 2013). Based on the theorization of internationalization in SMEs as a dynamic activity, in which firms that are engaged in international business tend to engage in a different range of innovative activities (Ren et al., 2015), we concentrate on one of the most popular mediators: technological innovation. To this end, we examine the

[3] For example, Liang et al. (2012) examined the outward IO in small enterprises in China and found that outward internationalization benefited privately owned enterprises to overcome resource deficiency and capability disadvantages in foreign markets. Yet their study focused solely on factors that facilitate outward IO of firms, while considered inward IO simply as a controlling factor.

mediating mechanism of technological innovation on the IO - international firm performance relationship. Carnes and Ireland (2013) refer to technological innovation as 'innovation in the form of inputs, activities and outputs'; we use this definition to define innovation within our study.

Innovation represents one of the most important and sustainable sources of competitive advantage for the internationalizing SMEs (Madrid-Guijarro et al., 2009). Some of the key benefits stemming from the SME innovation activities include first mover advantages (Porter, 1980), brand loyalty and reduced price sensitivity of customers (Liberman and Montgomery, 1988), learning in identifying, assimilating and applying knowledge (Van De Ven and Polley, 1992); increased productivity and economic growth (Cainelli et al., 2004). SMEs being faced with numerous challenges and barriers when competing in the international markets (lack of resources, lack of experience, lack of networks and reputation etc.) are constantly driven by finding novel, innovative ways to accomplish their international reach (Child et al., 2017)[4]. Novel strategies and business models are adopted in line to the demand, culture, and competitive conditions of the international market (Landau et al., 2016; Child et al., 2017). Up-to-date technologies and new techniques that quickly respond to the new market dynamics (Damanpour and Gopalakrishnan, 2001) are also developed, as well as creative products that allow SMEs to differentiate themselves among their global competitors (Gupta and Barua, 2016), minimize the risks of competition (Oura et al., 2015), and consequently increase their overall productivity and growth (Sikka, 1999).

Acknowledging the restrictions SMEs have in accessing scarce financial and human recourses (Wadhwa et al., 2017), and the risks of technological innovation, deciding which techniques will be promoted in the international market becomes a pertinent factor for firm success (Freixanet, 2014). Nevertheless, SMEs do have unique competitive advantages related to their flexibility, quick decision-making process and lack of bureaucracy that are known to alleviate the risks associated with technological innovation (Allocca and Kessler, 2006; Koskinen and Vanharanta, 2002; Nordman and Tolstoy, 2011). Meanwhile, cooperating with foreign partners in highly international-oriented SMEs is found to facilitate access to invaluable resources and knowledge internationally that can be particularly instrumental for SMEs technological innovation (Zahra et al., 2009).

We can therefore argue that both inward and outward IO are required for international success. Having an outward IO, focusing on exporting and/or the cooperation and alliances with foreign partners, can facilitate the exploitation of global resources in host countries, whereas an inward IO focus resulting in new technologies, products and new skills development can further enhance SMEs innovation capacity (Castellani and Zanfei, 2007; Halilem et al., 2014). In other words, for success in the international markets requires - as defined by Child et al. (2017) - an 'ambidextrous explorer international business model'. In fact, Child et al. (2017) found that successful high-tech SMEs adopt a ambidextrous explorer international business model to explore and utilize knowledge from all available sources, such as university and other government institutions, for achieving high-added services and competitive advantage.

Nevertheless, and while technological innovation can provide competitive advantages for internationalizing SMEs, this can also be risky given the amount of investment required in R&D, suggesting that the relationship may not always be positive (Wadhwa et al., 2017). Negative effects have been documented, for example resistance to the adoption of innovation internally (Hultink and Atuahene-Gima, 2000) and the marketplace (Rogers, 2003), innovation is resource intensive and as such a risky process that can be destructive to smaller, low resourced firms (Li and Atuahene-Gima, 2001). Innovation is defined as a multifarious phenomenon, it can therefore be assumed that some types of innovation may be more

[4] Child et al. (2017) classified SMEs' international business model into three categories of traditional market-adaptive business model, technology-exploiter business model and ambidextrous explorer international business model and based on the firms' different innovation techniques for value creation.

beneficial than others (Damanpour et al., 1989). Thus, the assertion that innovation benefits SMEs irrespective of the conditions in which they operate, provides an incomplete understanding of the innovation-performance relationship (Boso, et al., 2013). In fact, Rosenbuck et al. (2011) showed that the innovation–performance relationship is context dependent, with firm age, type of innovation, and culture largely impacting on it.

To this end, Hatzikian (2015) argues that linear relationship may not describe the performance implications properly. Exploring the non-linear relationship between innovation and firm performance in Greek firms, he found that innovation intensity follows a U-shaped curve with relation to the firm's labor productivity. The aggregated results show that from the first stages of engaging in innovation activities, the firm performance is negative. Overtime, firms learn how to manage and develop their innovation activities and gain superior performance. However, due to the small sample size, different aspects of innovation activities, such as product and process innovation, and other internal and external factors that may influence the relationship were not examined in the study. Márquez-Ramos and Martínez-Zarzoso (2010) also examined the effect of technological innovation on international performance and the results indicate that technological innovation has a positive and non-linear effect on export performance[5].

From the above, it can therefore be argued that a non-linear relationship may exist between technological innovation and international firm performance. While certain levels of technological innovation are imperative for the success of an SME in the international arena, too much innovation or too little may actually hamper their international performance. Sustaining high levels of technological innovation will result in heavy resource investment that SMEs might not be able to support for long periods of time (Li and Atuahene-Gima, 2001) and can even cause internal disruptions, hampering as such the operational vitality of the company (Hultink and Atuahene-Gima, 2000). At the same, very low levels of technological innovation will not be sufficient to prepare the SME for the new market requirements and the competitive conditions within ((Damanpour and Gopalakrishnan, 2001; Landau et al., 2016) reducing the company's overall competitive advantage. We therefore propose that:

H4: There is an inverted U-shaped relationship between technological innovation and international firm performance in SMEs'

2.4. Internationalization Orientation, Technological Innovation, and International Firm Performance

From the above discussion, it is not surprising that innovation has been closely associated with both internationalization and performance of SMEs (Castaño et al., 2015; Kumar et al., 2013), with the relationship being multi-directional (Ren et al., 2015). On one hand, international firms that are innovative are more likely to respond quickly to market changes, create advances to develop new goods and services first that can allow them to overpower a host market (Damanpour and Gopalakrishnan, 2001). Such firms have performed better than their competitors in foreign markets in terms of market share, customer satisfaction, sales revenue and profitability (O'Cass and Weerawardena, 2009). On the other hand, internationalizing SMEs with access to the global market, are offered unique opportunities to learn from their foreign contacts, adopt advanced technology and utilize new technological methods of producing goods, which can overall help them increase their productivity and growth in either the domestic or the host markets (Cassiman and Golovko, 2011).

[5] A U-shaped relationship between old innovation activities and export performance and an inverted U-shaped relationship between recent innovation activities and export performance

Interesting though, the empirical literature has so far been unable to offer full support to the innovation-performance relationship with evidence from the broader literature suggesting that the innovation-performance relationship may be more complex than previously thought (i.e. Rosenbusch et al., 2011). Meanwhile, very few studies have examined the innovation-firm international performance relationship in the context of SMEs (Knight, 2000; O'Cass and Weerawardena, 2009), with most of them focusing on the relationship between innovation and export activities alone (Fernández-Mesa and Alegre, 2015; Hughes et al., 2010; Silva et al., 2017). For example, Fernández-Mesa and Alegre (2015) found a positive relationship between innovation and export performance of Spanish and Italian SMEs. Silva et al. (2017) investigated the effects of breakthrough tech-innovation and market innovation on international economic and export performance of Portuguese manufacturing exporting firms, and found that tech-innovation enhanced international firms' export and economic performance. Their results also revealed that the positive effect of tech-innovation becomes stronger in less competitive market places with weaker technological innovative competitors. As a result of the above, our understanding of the underlying relationship between innovation and SME international performance remains largely inconclusive (Carnes and Ireland, 2013; O'Cass and Weerawardena, 2009).

The fundamental question in this study is why and how technological innovation mediates the relationship between IO and international firm performance? Driven by the lack of concrete prior empirical and theoretical support, we therefore turn to the resource-based and dynamic capabilities perspective to first explain the key mechanisms that influence SME international firm performance. According to the resource-based perspective, profitable firms are those with highly structured systems that strategically invest in new markets with markedly lower costs and usually provide high-quality products (Teece et al., 1997). This approach often focuses on utilizing firms' existing assets (Wernerfelt and Montgomery; 1988) and emphasize on the rents belonging to the firms that own scarce resources (Teece et al., 1997). However, this does not completely explain the competitive advantages of firms that operate in foreign markets that need to quickly respond to environmental changes by developing a product or process innovation, or SMEs which have limited access to assets and resources. Furthermore, it has been argued that although controlling the scarce resources could be the source of economic performance, not all firms with great assets have necessarily enough capabilities (Teece et al., 1997).

These issues highlight the importance of managerial orientation (e.g. managerial skills, strategies, knowledge, and know-how) for developing new dynamic capabilities (Shuen, 1994). Teece et al. (1997) described dynamic capabilities as a new form of achieving competitive advantage and defined it as "firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments." (Teece et al., 1997. P. 516). Thus, competitive advantage can be achieved by utilizing both existing capabilities and developing new and innovative capabilities. We therefore propose that the relationship between IO and firm performance can be boosted by developing strategic capabilities to develop new products or improve existing products and adapt to changes in the business environment. The nature of this relationship is the two-way link between IO and innovation. To explain the mechanism of innovation, we argue that technological innovation represent an efficient tool to respond to the demand of the international market, overcome the SMEs' resource limitations, facilitate international operations and new capabilities' development and enhance firm performance. IO of SMEs is, therefore, a key factor for gaining firm's competitive advantage. In this context, technological innovation plays a key role in achieving this competitiveness and increasing firm performance.

A noteworthy study by Cassiman and Golovko (2011), showed indeed a positive relationship between internationalization and innovation in Spanish SMEs. They found that those SMEs, which had access to the global market, were able to learn from their foreign partners, adopt advanced technology and utilize new technological methods of producing goods that help them achieve productivity and growth higher than their non-innovative counterparts. Similarly, Nordman and Tolstoy (2011) report that little is known regarding

the technological innovation in internationalizing SMEs. Previous studies have mainly analyzed the direct internationalization- firm performance relationship in the context of SMEs, and have not considered the influencing factors as mediators. Furthermore, according to the related literature, the inverse relationship between internationalization and innovation require greater examination (Damijan et al., 2010; Knight and Cavusgil, 2004; Ren et al., 2015).

Based on the mentioned multi-directional relationships, we hypothesize a mediating mechanism of technological innovation on the relationship between IO and international firm performance and contribute to the literature by examining how internationalization influence the innovative capacity in the SMEs and suggests that there is a positive relationship between IO and technological innovation (Ernst and Unctad 2005). Acknowledging the need to further investigate this multi-directional relationship between internationalization and innovation (Damijan et al., 2010; Damijan and Kostevc, 2015; Knight and Cavusgil, 2004; Ren et al., 2015), particularly in the SME context which has been rather neglected in the relevant literature, we examine the relationship between IO of UK SMEs and their technological innovation capacity. We expect and propose that there will be both a direct and an indirect effect between IO and technological innovation in SMEs; IO will be positively associated with technological innovation, which will further mediate the IO – international performance relationship, leading to higher overall firm performance.

Taking all the above into account, we, therefore, propose that:

H5: There is a positive relationship between IO and technological innovation in SMEs.

H6: Technological innovation positively mediates the effect of IO on firm international performance.

2.5. Conceptual Framework

Based on the above discussion and the hypothesis formation, we draw in Figure 1 an integrative theoretical framework illustrating the relations and directions expected among the three examined constructs: IO, technological innovation, and firm international performance. Our model predicts that IO can improve international firm performance, whereas technological innovation has a mediating role in the underlying relationship between IO and international performance. In addition, in Figure 2 we examine and explain each aspect (inward and outward) of international orientation separately to further illustrate their direct relationship with international firm performance. As per our hypotheses, we predict that firm performance is unaffected when only one aspect of IO is utilized. The unit of our analysis is SMEs in the UK.

--- Please insert Figure 1 here ----

--- Please insert Figure 2 here ----

3. Methodology

3.1. Sample and data collection

To collect our data, a survey instrument was created that was disseminated to a random sample of international SMEs operating in several innovative industries in the UK. Motivated by Grinstein & Goldman (2006), we chose to focus on firms that emphasized on technological activities and technology-based products, including as such more innovative sectors in our sample rather than restricting ourselves within the industries of computing and bio-tech. We hence focused on eight sectors that showcase among the highest innovative activity within the UK, as identified in other prior studies by Battisti & Stoneman (2010) and Hooker & Achur (2014). These are: engineering and machinery, electronic and electrical equipment, household products, wholesale/retail, information technology, food products, beverages and business services.

The targeted SMEs were identified by using two criteria: (a) firm size (number of employees that were less than 250), and (b) firms exhibiting international business activities. After the first screening process, the survey was finally sent to 1,180 SMEs from all eight sectors; the list of firms was identified from the Company's House database.

To avoid common method variance or bias, we adopted several strategies: (a) we used brief, simple, specific and focused questions; (b) explained ambiguous phrases and refrained from complex syntax (Podsakoff, 2012); (c) chose top management teams as informants; and (d) checked each questionnaire for accurate completion. Following a series of follow up telephone calls to prompt responses, a total 122 SMEs responded to the survey. Six of these responses were rejected as incomplete. We finally ended up with a sample of 116 suitable for analysis responses, accounting for an acceptable 10% response rate (EscribÃ¡-Esteve et al., 2009).

All the firms in our sample were engaged in international business in the following sectors: Engineering and machinery (10.3%), electronic and electrical equipment (6%), household products (6%), wholesale/retail (11.2%), information technology (7.8%), food products (30.2%), beverages (9.5%) and business services (19%). Approximately 40% of the firms were exporters, 17% were importers and the rest were engaged in the other international operations (Approximately 13% joint venturing, 8% licensing and 8% franchising, 12% foreign direct investment).

The number of employees (firm size) is outlined in Table 1. The data indicates that the greatest percentage of firms (approximately 33%) had 130 to 149 employees, 26% had 50 to 89 employees, 22.4 % of the respondent firms had 90 to 129 employees, 15.5% had 10 to 49 employees and only 3.4 % were classified in the 1 to 9 employees group. Furthermore, the frequency distribution and the percentage of firm age indicate that 29% of the firms were more than 21 years old, 17% of them were 16 to 20 years, 23% were 11 to 15 years old, 21.6% were six to 10 years old and only 8.6% of the firms were one to five years old. According to the Oslo Manual of European Commission (OECD/Eurostat, 2005), SMEs are categorized as micro (less than 10 employees), small (10-49 employees) and medium (50-249 employees). Having just 22 micro and small companies show that the majority of our sample were medium-sized established enterprises.

It is worth noting that with respect to firms' headquarters' location, England had the greatest percentage of internationalized SMEs (approximately 63%), 21% were located in Scotland, approximately 15% were located in Wales and the smallest percentage were located in other parts of the UK (approximately 1.7%).

-- Please insert Table 1 here ----

Regarding the respondents' characteristics, the majority of the respondents were between the age of 30 to 39 (31%) and 40 to 49 (32.8%). In addition, 63 of the respondents were male (54%) and 53 were female (46%). With respect to the respondent characteristics, most of the owners and CEOs (approximately 73%) were male. However, the majority of female managers were working as a board member and other

managerial roles (61%). The data also demonstrates that 40 percent of the owners were above 50 years old and 46 percent of the CEOs were between 40 to 49 years old. On the other hand, the majority of the participants who had other positions rather than being the company's owner, CEO and board member, were between 30 to 39 and 40 to 49 years old. The information shows that age is particularly related to the managers' positions. [6]

3.2. Variables and measures

Dependent variable- firm international performance. International firm performance has traditionally been measured with both objective and subjective indicators (Gerschewski et al., 2015; Hult et al., 2008). However, in the context of SMEs using objective variables has always been rather problematic. It has been well documented that within this context accounting and profitability measures can be "easily manipulated for tax evasion purposes", whereas market-value ratios are "difficult to calculate for small, private and unlisted firms" (Bamiatzi et al., 2014: 264). At the same time, objective measures have been known to vary significantly across the smaller companies due to the particularities of their size and operational focus (some focus more on growth while others on employment stability and cash flow) (Davidsson et al., 2006), whereas obstacles stemming from owners/managers unwillingness to disclose actual performance data has also been noted (Gerschewski et al., 2015; Sapienza et al., 1988). As a result, the majority of studies within the SME literature has favoured subjective indicators of performance (Davidsson et al., 2006; Park and Luo, 2001; Zhou et al., 2007). Motivated by the above, in our study we use subjective performance indicators that have been known to be positively associated to objective performance (Gerschewski et al., 2015; Hult et al., 2008).

More specifically, multiple dimensions of international firm performance have been measured by using a five-point Likert-scale. The three dimensions included financial, operational and perception of success following Gerschewski et al. (2015), Hult et al. (2008), Venkatraman and Ramanujam (1986). The international firm performance scale consisted of seven items:

1) Your firm's international market share objectives have been achieved.
2) Your firm has met the turnover objectives that set for international activities, and turnover has increased in the last three years.
3) The level of success in foreign markets is satisfactory in your company.
4) The level of sales volume has increased in your company.
5) Your company has achieved the profitability and growth.
6) Internationalization has a positive impact on your company's profitability.
7) Production and transaction costs have decreased in your company due to having international activities.

Previous studies have measured business performance by assessing the last three years of engaging in business activities (Park and Luo, 2001; Zhou et al., 2007), we have also taken this approach, respondents were asked to evaluate their firm's international performance for the last three years and indicate the extent to which the mentioned statements relate to their organization's international performance. All the measures were scaled from 1 (strongly disagree) to 5 (strongly agree).

Mediating variable. Many studies found a complementary between product and process innovation (Ballot et al. 2011; Miravete and Pernías, 2006; Wadho and Chaudhry, 2018) that leads to a greater firm performance. Thus, the survey questionnaire included the standard questions to measure technological (product and process) innovation, and is based on the idea that firms usually apply different techniques simultaneously to innovate to enhance firm performance (Martinez-Ros and Labeaga, 2009;

[6] For detailed results of the characteristics of the participants see the supplementary online material.

OECD/Eurostat, 1997; 2005; Wadho and Chaudhry, 2018). For example, by introducing new products to the market and using advanced technological innovation in the process.

Thus, technological innovation in our study was operationalized by a composite index of product and process innovation. In addition, we have collected data on the different characteristics of the technological product and process innovation to improve the quality of the results (OECD/Eurostat, 2005). For example, we assume that SMEs that introduce new products or services to foreign market also need to develop a new process. Therefore, they are technological product and process innovation-oriented enterprises.

Technological product and process innovation were measured using a five-point Likert-scale adopted from Miller and Friesen (1982) and Wadho and Chaudhry (2018). Items which were measured included; how successful the firm is in introducing new products to the market, the speed of new product development, the use of latest technological innovations, upgrading existing products, technological competitiveness of the firm, adopting the latest technological innovations in firm's processes and being up to date in the processes.

Independent variable. IO is the independent variable in this study. We considered two aspects of inward and outward internationalization orientation; these were measured by using a five-point Likert-scale adopted from Zhou et al. (2007). For the concept of internationalization orientation, the company's management expertise, ability to utilize technology from foreign market and utilizing foreign direct investment was used to measure inward orientation. In order to measure outward internationalization, questions were used to ascertain the extent to which firms were seeking new foreign market development and market relationships with business partners in host countries.

In Table 2 we provide the results from the descriptive statistics of inward and outward IO as well as product and process innovation levels. As we can see, the examined SMEs scored high in both inward and outward IO; inward IO scored a mean of 3.54, while inward IO followed closely with a mean of 3.29. However, outward IO is clearly more significant than inward orientation.[7] To measure technological innovation, respondents were asked to rate their firms' innovation activities in line with the nine items mentioned earlier. Meanwhile, process innovation scored a high mean of 3.53 followed very closely by product innovation with a mean score of 3.50. [8] Finally, international firm performance also scored on average a score of 3.55, although international firm profitability received the highest score (3.74) whereas production costs the lowest (mean of 3.31).

--- Please insert Table 2 about here ---

4. Data analysis and results

4.1. Statistical method

[7] The statistics show that the value of 5 indicators of internationalization orientation are also high and fine. for detailed results evidencing this argument see the supplementary online material.

[8] The statistics show that the value of 9 indicators of technological innovation are also high and fine. for detailed results evidencing this argument see the supplementary online material.

We use Structural equation modeling (SEM) technique to analyze the data collected and test our hypothesized conceptual model. SEM has been chosen because it can be used to examine the relationships among latent variables identified by multiple measures while assessing the validity of existing theories with empirical data (Lei and Wu, 2007). We used the IBM SPSS AMOS software version 22.

--- Please insert Figure 3 about here ---

--- Please insert Figure 4 about here ---

4.2. Data measurement model

Before examining the relationship between variables and testing the hypotheses, we examined test validity to ensure that our findings are representing the phenomena under research and that our measurement is correct. To this end, we used Kaiser-Meyer-Olkin (KMO) and Bartlett's test of Sphericity to demonstrate that the data is appropriate for factor analysis. Table 3, provides the results of the KMO and Bartlett's test. As we can see, KMO of sampling adequacy is 0.90 which is higher than 0.5 ($0.90 > 0.50$), and the significant Bartlett's test is 0.00 which is less than 0.001 ($0.00 < 0.001$). Therefore, it was concluded that the data is appropriate for conducting factor analysis.

--- Please insert Table 3 about here ---

With regard to the measurement model, we evaluated individual item reliability which is confirmed by Cronbach's alphas (Table 4). Loadings are generally above the accepted threshold of 0.7 (Cortina, 1993; Cronbach, 1951), both for indicators and first-order factors related to reflective higher-order constructs. The reliability of the three latent variables (internationalization orientation, technological innovation, and international firm performance) was measured by composite reliability (Werts et al., 1974) and the measures were 0.68, 0.86 and 0.91 which again demonstrated the high reliability of the findings and that the data was suitable for further investigation. We validated our measures of internationalization orientation, technological innovation and international firm performance using factor analysis, in which the values of factor loading was at the high level and was above the threshold of 0.5, which indicated the significant level of factor loading and explicit factor composition.

--- Please insert Table 4 about here ---

We also assessed the multicollinearity by examining tolerance and the Variance Inflation Factor (VIF). As the results have not shown that the values of VIF exceeded 10 (Belsley, 1980; Dormann et al., 2013), we are ensured that our study is free of any multicollinearity issues. Therefore, there are no results in unstable parameter estimates that could hamper the assessment of the impact of technological innovation and IO on international firm performance.

Structural (Path) model.

We used Path analysis, which involves multiple equations that are estimated simultaneously, to model direct, indirect and mediation effects, and estimates multiple relationships among variables (Lei and Wu, 2007). In the structural model assessment, we estimated the path coefficients and *T*-values for predictive relevance. This analysis was carried out both for the total sample and for the subsamples (Figure 3).

According to the results of the multivariate analysis (table 5), the first hypothesis was suggesting a positive relationship between internationalization orientation and international firm performance. Based on the results, the hypothesis is confirmed ($\beta = 0.711$, $P<0.001$). In addition, we have investigated the inward-outward connections, the model fit and the correlation between each aspect of inward and outward operations on firm performance. The results indicate the positive and significant correlation between inward-outward connections, and the model fit summary shows that the model is a good fit for the data

tested. The values of TLI, CFI and IFI, which indicate the effectiveness of the designed model, are 0.93, 0.94 and 0.95 respectively, and are all above the threshold of 0.90 (Dion, 2008). Interestingly, the relationship between inward IO on international firm performance and outward IO on international firm performance separately are not significant that confirms our second and third hypotheses.

The second hypothesis suggested that international firm performance is unaffected by the presence of inward internationalization orientation. Indeed, our results show that there is no significant relationship between inward internationalization orientation and international firm performance (β= 0.64; P>0.001). There is also no significant relationship between outward internationalization orientation and international firm performance (β= 0.12; P>0.001), supporting our third hypothesis. The results also indicate that there is a positive relationship between internationalization orientation and technological innovation, which confirm the fifth hypothesis (β = 0.575, P<0.001).

We also test the inverted U-shaped relationship between technological innovation and international firm performance (forth hypothesis). We performed a curvilinear regression analysis and test a quadratic effect by using a hierarchical multiple regression approach to test a nonlinear effect. Model 1 and 2 explain the relationship between technological innovation (TI) and international firm performance (IFP). In model 1, the linear regression are tested, and the high R^2 value (.65) indicates that 65% variance in IFP can be attributed to the movement in the predictor variable (TI) and the relationship between TI and IFP is statistically significant ($r = 0.81$, $p < 0.01$).

When the TI squared is added in model 2, The R^2 increase from 0.65 to 0.69 (The R^2 for the total model including both linear and non-nonlinear effect is .694 with the f-value of 128.02 and the R^2 change of 3% which is associated with the f-value of 13.21), and the change in the R^2 between Model 1 and Model 2 are also statistically significant but negative ($r = -1.61$, $p < 0.01$) which imply that the trend in the quadratic effect is going down, and the beta value suggests that there is a downward slope.

Thus technological innovation and its squared term are significant predictors of international firm performance providing support for our hypothesis which proposed that there is an inverted U-shaped relationship between technological innovation and international firm performance. The findings show that lower and higher degree of technological innovation does not enhance international performance of SMEs. However, it can be argued that a moderate level of technological innovation activities can ensure an increase in SMEs' performance.'

Table 5 presents the results of path coefficients (Beta estimates), T-values (CR), and P-values demonstrating the suggested hypotheses and table 6 presents the results of Curvilinear regression analysis.

--- Please insert Table 5 about here ---

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4.3. Mediating effect of Technological innovation

To analyze the mediating effect of technological innovation on the IO-international firm performance relationship, both direct and indirect effects were analyzed. First, we used the three steps mediated regression method introduced by Baron and Kenny (1986). We tested the mediating effect of technological innovation on the IO-international firm performance relationship by examining the direct relationship between combined aspects of inward and outward IO on international firm performance. We found a positive and significant direct relationship which satisfied the condition of mediation. More precisely, we found that IO has a significant effect on technological innovation (β= 0.57; P<0.001), and technological innovation has a significant effect on international firm performance (β= 0.86; P<0.001).

Second, we tested for indirect associations of technological innovation. Following the methods suggested by Baron and Kenny (1986), we discovered that technological innovation fully mediates the association between IO and international firm performance. According to the results, before technological innovation enters the model as a mediator, there is a significant direct relationship between IO and international firm performance ($\beta = 0.711$; $P<0.001$). We compared the direct effect of IO on firm performance to indirect and the total effect of IO on firm performance. We found that in the presence of technological innovation as a mediator, the direct effect of IO on firm performance was dropped from 0.711 to 0.197 and was non-significant. Therefore, we concluded that technological innovation completely mediates the association between IO and international firm performance. Full mediation predicts that the direct relationship between independent variables and dependent variable will not be significant in the presence of the mediator, but the indirect effect through the mediator will be significant.

--- Please insert Table 7 about here ---

Specification tests are used to test the specifications errors and to confirm the validity of one specification at a time (Bera and Jarque, 1982). Among the different methods of testing the specifications (Bera and Jarque, 1982; White and MacDonald, 1980), we experimented the alternative specifications of the regression by first randomly excluding the 20% sub-samples and analyzing the data and the correlations to see if in small samples the approach yields the same results. Second, we used alternative specifications by excluding the indicators that used for measuring IO to see how accurate the estimates are and if the results are still robust. In this study, we also conducted bootstrapping technique by maximum likelihood and random sampling with replacement to determine the measure of accuracy to sample estimates (Efron, 1979). By evaluating p-value to examine the statistical significance of the effect, we reject the null (of zero effect) as $p< 0.05$. Therefore, based on the results, the indirect effect of IO on international firm performance is statistically significant in the model.

--- Please insert Table 8 about here ---

All in all, our findings corroborate that technological innovation acts as a mediator in the international orientation – international performance relationship. Furthermore, we found that independently inward and outward aspects of IO had no significant effect on international performance but mattered only when observed simultaneously.

5. Discussion and Implications

This study has sought to explore a two-way link between IO and technological innovation by examining indirect, direct and total effects of technological innovation on the IO and performance implications of SMEs using structural equation modeling. The model was designed based on the operational definitions of technological innovation (product and process), IO (inward and outward) and international firm performance. In this research, we consider organizational learning perspective to emphasize the role of cooperation and knowledge in increasing absorptive capacity (Hernandez and Nieto, 2016).

Our findings overall demonstrate a clear relationship between IO and international firm performance. The relationship between IO and international firm performance is found to be positive and significant, whereas no significant relationship between either inward or outward IO and international firm performance is observed when the IO facets are examined independently. This confirms our hypothesis that having both inward and outward IO and utilizing both aspects simultaneously can lead to superior international firm performance. This finding is consistent with previous -albeit limited- empirical studies while further

explains the lack of statistical evidence of a unilateral relationship between either inward or outward orientation (i.e. Hernandez and Nieto, 2016; Zhou et al. 2007).

It seems that as suggested by Hernandez and Nieto (2016), SMEs undertaking both aspects of IO have the opportunity to acquire knowledge by building associations and complementarities that improve and expand their overall knowledge and absorptive capacity. As a result, they are better in identifying foreign market opportunities, risks and costs associated with international business and the solutions to the potential threats and eventually achieve superior performance (Yao et al., 2013; Zahra and Georg, 2002). The inward-outward connections, in particular, help SMEs to utilize inward internationalization operations more efficiently for obtaining technology knowledge. The connection also allows firms to better recognize the market knowledge associated with outward IO. Thus, we argue although outward orientation facilitates the use of market knowledge and inward orientation allow firms to benefit from technology knowledge, it is important for international managers to be both inward and outward-oriented in order to benefit from their advantages and achieve a better firm performance. Emphasizing on only one operation (inward or outward orientation) does not lead to the superior firm performance.

Considering the two-way link between IO and technological innovation, we reveal that while IO (inward-outward) fosters technological innovation (Ernst & Unctad, 2005), at the same time product and process innovation enhances even further the opportunities of IO (Kotabe et al., 2007) creating as such an interlocked loop between the two constructs. We hence observe that there are both direct and indirect effects of technological innovation and IO; a direct relationship exists between IO and technological innovation, and since technological innovation and international firm performance are also directly influenced, an indirect relationship between IO and international performance is also to be expected.

Interestingly, further analysis of the above-mentioned relationships reveals an inverted U-shape relationship between technological innovation and international firm performance, consistent to the studies by Hatzikian (2015) and Márquez-Ramos and Martínez-Zarzoso (2010). We find that the less technologically innovative firms have the lowest performance, while SMEs with a moderate level of technological innovation activities could gain the highest competitive advantage and above a certain threshold, any increase in innovation activities would have a negative effect on the SMEs' performance, as cost of the activities outweighs the benefits. This finding is particularly important because it can actually explain some of the inconsistencies observed in previous studies on the relationship between technological innovation and firm performance (Li and Atuahene-Gima, 2001; Rosenbuck et al., 2011). Therefore, we can suggest that international managers need to pay attention to the balance between the costs and benefits associated with undertaking technological innovation activities. In other words, with every step in developing technological activities of firms in foreign market, they should consider their resource limitations, constraints and the costs and risks associated with these activities.

This study offers several managerial implications and suggestions for the SMEs managers aspiring to expand their activities internationally. Firstly, we clearly reveal that to maximize resource utilization and international potential, it is imperative for SME managers to simultaneously concentrate on their outward and inward operations when internationalizing. This suggests that SME managers need to be more proactive in cooperating with foreign partners and utilizing advanced technology from foreign countries in order to increase their performance, while at the same time rigorously preparing their organizations internally for the challenges emerging. The outward orientation offers SMEs with invaluable advantages, such as increased foreign market knowledge, reduced risk and uncertainty, expanded business network, competitive positioning (Karlsen., et al, 2003), that can reduce the overall time required to establish within the foreign market, and better secure the firm's overall survival and dominance within the market. At the same time, by advancing simultaneously their management skills and developing internally new technologies, SMEs

can attain unique opportunities to gain a competitive advantage within the host market, resulting in their overall higher international performance.

Secondly, SME managers need to seriously consider the effect of technological innovation on the relationship between IO and international firm performance. Our findings show that if SMEs were to engage in more technical innovation techniques, this would have direct implications on their overall international performance and competitive advantage. Therefore, a key task for SME managers, who aspire to internalize successfully, is to invest in developing their technological innovation capabilities; by advancing their product offerings and process efficiencies both domestically and in the foreign market, they can better ensure their success within either market.

Finally, our study also offers implications for policymakers. These include establishing supportive programs by considering the integration of inward and outward operations for SME that wish to engage in inward and outward strategies simultaneously, such as enabling collaboration among firms and trade across borders to facilitate knowledge exchange and market opportunities. It is further recommended that provisions should be made for programs that can support and foster innovation capabilities within internalized SMEs. Having clearly shown that SMEs with higher innovative capacity can gain superior international firm performance, policies that competently enable managers to embark on such strategies could, in turn, provide a stronger more vibrant economy and a globally competitive business environment.

Overall, our study contributes to the understanding of IO of SMEs according to the two aspects of orientations developed. Additionally, given SMEs' 'liabilities of foreignness', we find that intangible resources, such as knowledge and associations in foreign market, are crucial for SMEs in improving their absorptive capacity and their overall competitive advantage, leading ultimately to superior firm performance.

6. Limitations and Directions for Further Research

Despite the valuable new insights offered by our study, it does come with certain limitations which need to be considered. First of all, our findings are rather country-specific. The UK context is an important one with vital significance to the European community; nevertheless, it is rather specific and can limit the generalizability of our results. Thus, future researchers should explore the mediating effects of technological innovation on the IO - international firm performance relationship of SMEs in other countries to be able to evaluate the overall generalizability of the current findings.

Second, an important limitation of our study is the dependence on subjective measures for the indicators of international performance and technological innovation. Despite the popularity of such an approach within the SME literature (Davidsson et al., 2006; Park and Luo, 2001; Zhou et al., 2007), the limitations of such a strategy are well noted, particularly when it comes to comparability and generalizability of findings. To this end, future research utilizing objective measures of international performance and innovation could provide invaluable insights to the relevant literature.

Third, we examined international firm performance as a whole, without considering performance obtained by a specific internationalization strategy (i.e. internationalization entry modes), and/or within a specific foreign market. While due to resource limitations, SMEs tend to adopt more conservative and consistent internationalization strategies, minimizing their international reach at a time, examples of rapid simultaneous expansion do constantly appear (i.e. born global firms). Therefore, it would be of particular importance to the international small business literature to examine how specific strategies are affecting the IO-International performance relationship, and how these are moderated by country-specific factors.

Time limitation was another restriction in our study; to this end, cross-sectional data was used to analyze our two sets of hypotheses but these cannot be used to specify causality. Longitudinal studies by using panel data would offer a more holistic understanding of the underlying relationships. In addition, a larger sample could provide further validation of the current findings which are based on a relatively small sample of 116 SMEs.

Finally, and motivated by Bell and colleagues (2004) who long debated on the importance of the industry on the international orientation of small firms, our study focused on innovative firms from eight industries (i.e. engineering, electronic and electrical equipment, wholesale/retail, information technology etc.). Unfortunately, we were unable to identify clear industry-related associations to our findings observed. Acknowledging that different innovation business models do exist among SMEs from different sectors, as well defined by Child et al. (2017), a more focalized study on a particular sector could offer even stronger validations for our findings, deprived from any sectorial differences.

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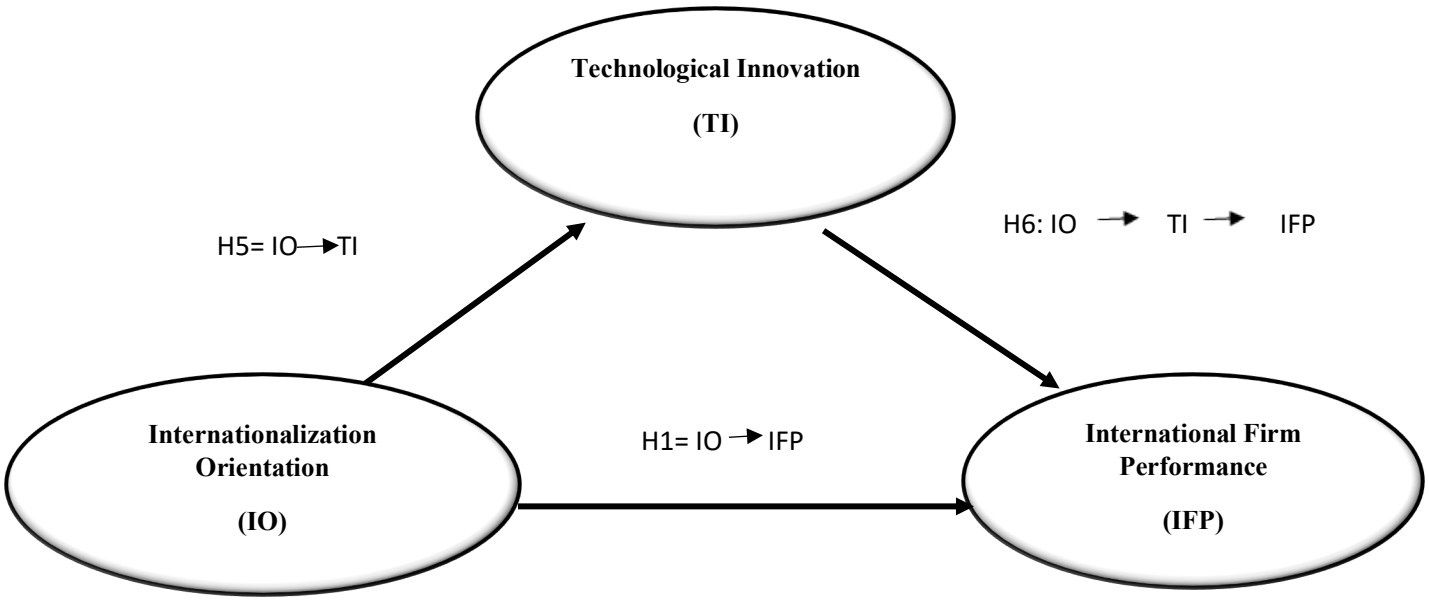
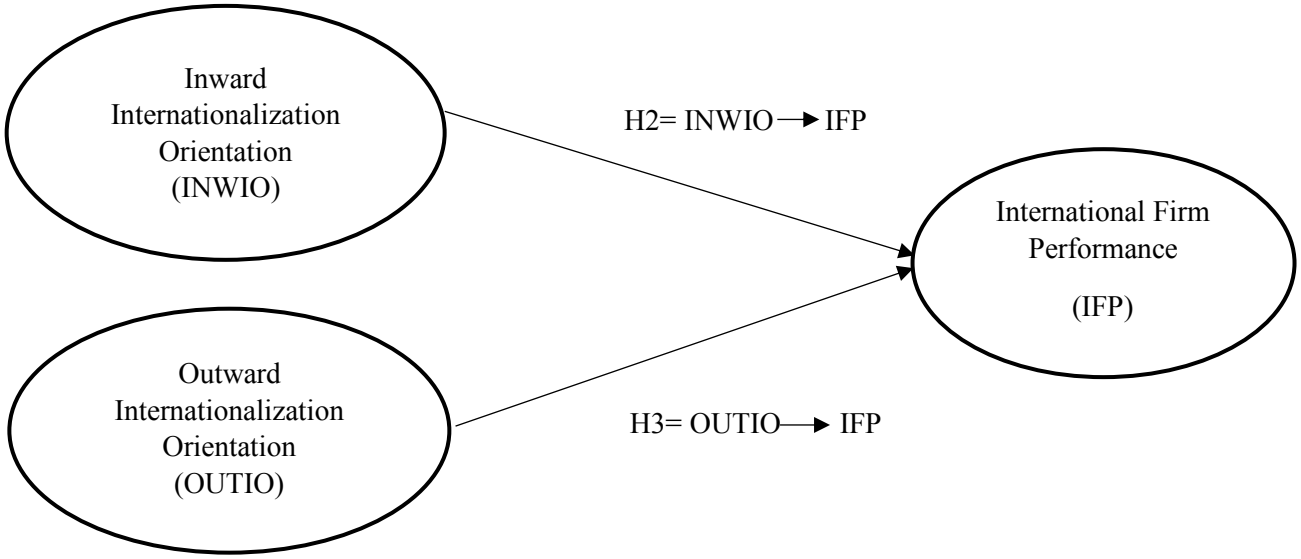
Figures and Tables

Figure 1. Research Model of the Relationship between Internationalization Orientation and Firm Performance and the Mediating Role of Technological Innovation



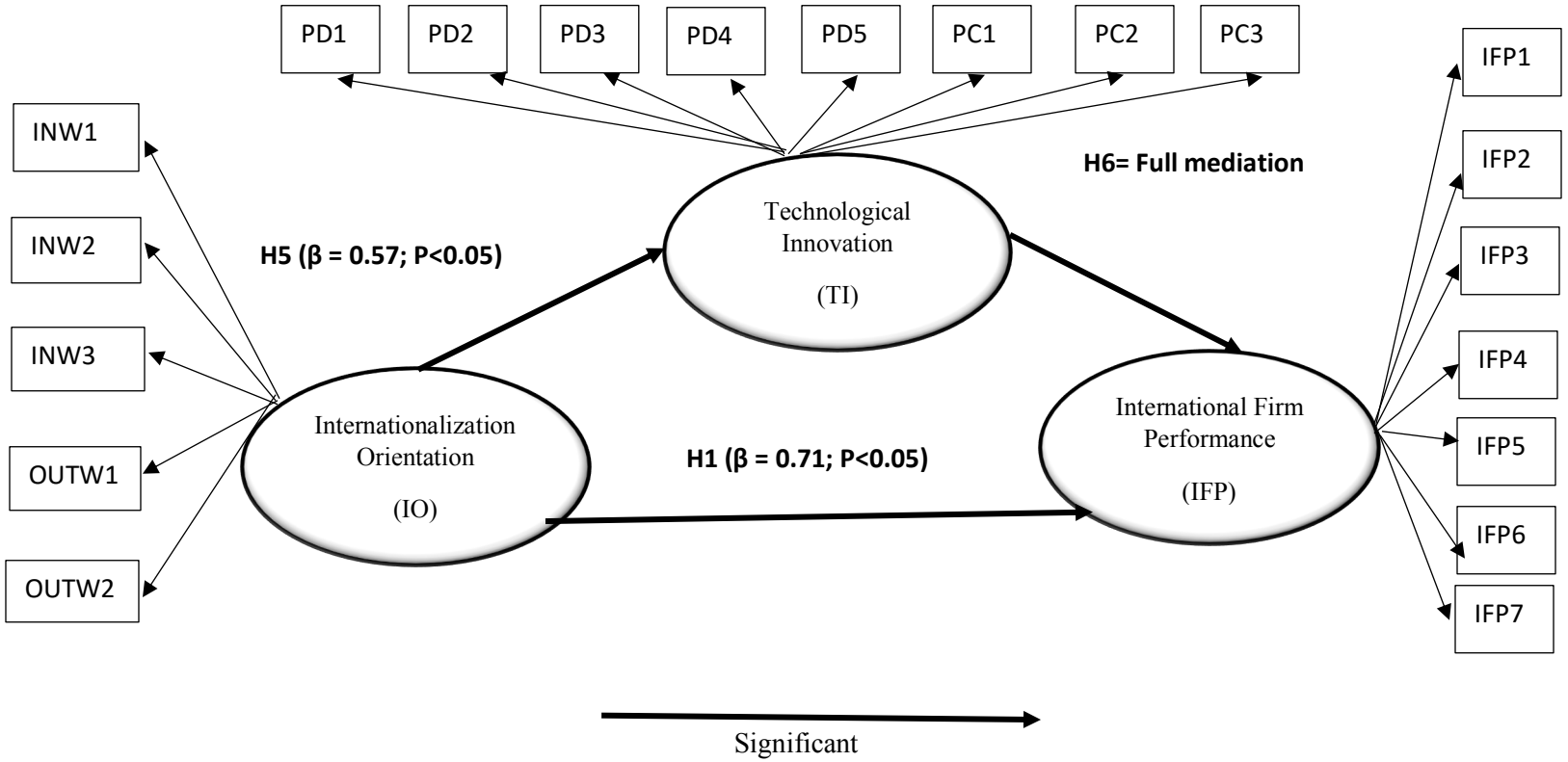
Latent variables: Technological Innovation, Internationalization Orientation, International Firm Performance.

Figure 2. Research Model for the direct Relationship between Inward and Outward Internationalization Orientation and International Firm Performance.



Latent variables: Inward internationalization orientation, outward internationalization orientation, international firm performance.

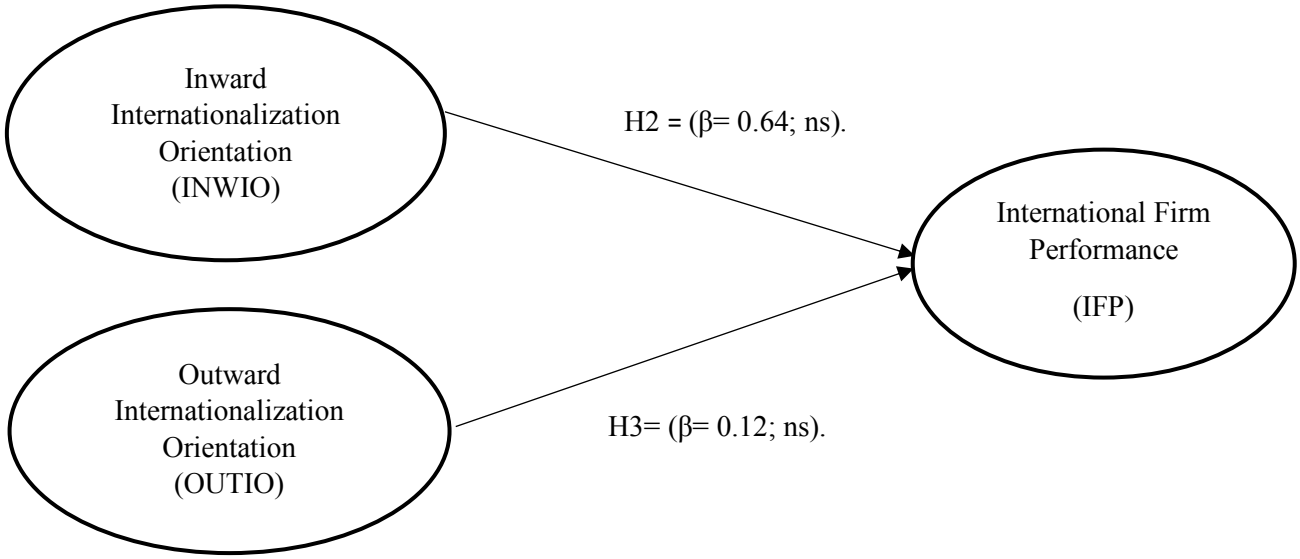
Figure 3. Results of the Estimated Model



Latent variables: TI: Technological Innovation, IO: Internationalization Orientation, IFP: International Firm Performance.

INW1 to INW3: indicators to measure inward internationalization orientation, OUTW1 & OUW2: indicators for measuring outward internationalization orientation, PD1 to PD5: indicators for measuring product innovation, PC1 to PC4: indicators for measuring process innovation, IFP1 to IFP7: indicators to measure international firm performance.

Figure 4. Results of the Estimated Model



Latent variables: INWIO: Inward Internationalization Orientation, OUTIO: Outward Internationalization Orientation, IFP: International Firm Performance.

ns: Not significant

Table 1. Firm size, and age distribution

Size Group	Firm Size	Frequency	Percent	Valid Percent	Cumulative Percent
1	1-9	4	3.4	3.4	3.4
2	10-49	18	15.5	15.5	19.0
3	50-89	30	25.9	25.9	44.8
4	90-129	26	22.4	22.4	67.2
5	130-249	38	32.8	32.8	100.0
	Total	116	100.0	100.0	-
Age Group	Firm Age	Frequency	Percent	Valid Percent	Cumulative Percent
1	1-5	10	8.6	8.6	8.6
2	6-10	25	21.6	21.6	30.2
3	11-15	27	23.3	23.3	53.4
4	16-20	20	17.2	17.2	70.7
5	21 or more	34	29.3	29.3	100.0
	Total	116	100.0	100.0	-

Table 2. Descriptive Statistical analysis

	Inward IO	Outward IO	Product Innovation	Process Innovation	International Firm Performance
Mean	3.29	3.54	3.50	3.53	3.55
Std. Deviation	0.88	1.1	0.81	0.94	0.93
Number of questions	3	2	5	4	7

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.905
Bartlett's Test of Sphericity	Approx. Chi-Square	1378.013
	df	210
	Sig.	.000

Table 4. Measurement model

Construct	Indicators	Composite Reliability	Factor Loading
Internationalization Orientation	Your company Utilizes advanced management skills to engage in international business with foreign countries.	.680	.637
	Your company Utilizes advanced and new technology from foreign countries.		.562
	Your company Utilizes foreign direct investment		.599
	Your company aggressively looks for entering into foreign markets.		.603
	Your company is interested in developing associations with foreign partners.		.654
Technological Innovation	The number of new products your company has introduced to the market.	.861	.606
	The number of your new products that are first to market.		.606
	The speed of your new product development.		.615
	The use of latest technological innovations in your new products.		.678
	Upgrading existing products' appearance and performance.		.506
	The technological competitiveness of your company.		.723
	The speed of adopting the latest technological innovations in your processes.		.704
	The up to dated technology used in your processes.		.607
	The rate of change in your processes, techniques, and technology.		.736
International Firm Performance	Your firm's international market share objectives have been achieved.	.918	.736
	Your firm has met the turnover objectives that set for international activities.		.807
	The level of success in foreign markets is satisfactory in your company.		.777
	The level of sales volume has increased in your company.		.747
	Your company has achieved the profitability and growth.		.842
	Internationalization has a positive impact on your company's profitability.		.839
	Production and transaction costs have decreased in your company due to having international activities.		.708

Table 5. Construct structural model, Regression Weights

	Path Coefficient (Beta Estimate)	S.E.	T-Values (CR)	P-Values	Hypotheses
TI ← IO	.575	.118	4.868	***	H5 (β = 0.57; P<0.05)
IFP ← IO	.711	.124	5.725	***	H1 (β = 0.19; P<0.05)
IFP ← INWIO	.645	.425	1.516	ns	H2 (β = 0.64; ns)
IFP ← OUTIO	.128	.332	.387	ns	H3 (β = 0.12; ns)

Notes: TI, technological innovation; IO, internationalization orientation; IFP, international firm performance; INWIO, inward internationalization orientation; OUTIO, outward internationalization orientation
***= p< 0.001, ns: not significant

Table 6. Results of Curvilinear regression analysis- Hypothesis Four

DV: International Firm Performance	Model 1 (Linear)	Model 2 (Curvilinear)
Constant	0.098	-3.008***
	(0.412)	(-3.402)
Technological innovation (TI)	0.982***	2.923***
	(14.810)	(5.437)
Technological innovation squared (TI^2)	-	-0.287***
	-	(-3.635)
F	219.328	128.02
Change in F	-	13.214***
R	0.811	0.833
R^2	0.658	0.694
Adj. R^2	0.655	0.688
Change in R^2	-	0.036***
N	116	116

Note: ***= p< 0.001

Table 7. Mediating effect of technological innovation

Relationship	Direct without mediator	Direct with mediator	Result
INTLO TECHIN INFP	0.711 ***	0.197 (ns)	Full mediation

The relationship without the mediator			Estimate	S.E.	C.R.	P
INFP	←	IO	0.711	.124	5.725	***
outwintl2	←	INTLOR	1.000	-	-	
outwintl1	←	INTLOR	1.064	.168	6.326	***
inwintl3	←	INTLOR	0.911	.176	5.174	***
inwintl2	←	INTLOR	0.454	.156	2.914	.004
inwintl1	←	INTLOR	0.604	.123	4.921	***
intlperform1	←	INFP	1.000	-	-	
intlperform2	←	INFP	1.074	.128	8.355	***
intlperform3	←	INFP	1.296	.148	8.783	***
intlperform4	←	INFP	1.097	.132	8.337	***
intlperform5	←	INFP	1.259	.132	9.533	***
intlperform6	←	INFP	1.165	.133	8.774	***
intlperform7	←	INFP	1.046	.143	7.311	***

After adding the mediator			Estimate	S.E.	C.R.	P
TECHIN	←	INTLOR	0.575	.118	4.868	***
INFP	←	TECHIN	0.864	.209	4.135	***
INFP	←	INTLOR	0.197	.119	1.646	.100

***= p< 0.001, ns: not significant

Table 8. Direct, Indirect, and Total Effects of Internationalization Orientation

Hypothesis	Total effect (without mediator)	Direct effect	Indirect effect	Result
INTLO → IFP	0.711 ***	0.22 (ns)	0.56*	Full mediation

***= p< 0.001, * = p<0.10, ns: not significant